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Zero Retries is a unique, quirky little highly independent, opinionated, self-published email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience. It's free (as in beer) to subscribe.

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Pseudosponsor - M17 Project

The mission of the M17 Project is to develop a new open source digital radio protocol (data and voice) for Amateur Radio. Please consider contributing talent and / or funds for this important work.

Request To Send

The Annual Pactor 4 Hurricane Ritual

The relatively quiet 2022 hurricane season ended this week with Hurricane Ian. Thus it was time for the now-normal annual ritual of ARRL submitting an Emergency Request to the FCC for a 60-day temporary waiver to use Pactor 4 on HF.

Pactor 4 is an advanced data communications system by SCS (Spezielle Communications Systeme GmbH & Co. KG) for use on the HF bands (not just Amateur Radio) that anyone can use by buying a Pactor 4 modem. Admittedly it's an issue that Pactor 4 is a proprietary data communications mode, but it's not encrypted (when used on Amateur Radio), and easily monitored with the simple, if expensive method of buying a Pactor 4 modem. Conceptually, the use of Pactor 4 on Amateur Radio HF isn't any different than the use of the proprietary DVSI CODEC used in Amateur Radio digital voice communications in D-Star, DMR, P25, and Yaesu System Fusion. There are numerous other proprietary technologies such as EA5HVK's VARA in common use in Amateur Radio which few have any issues with.

What's maddening with these numerous requests *(none declined by the FCC)* is that *nothing bad happens when they are granted and Pactor 4 is used on HF!* Yet these temporary waivers apparently aren't considered proof that Pactor 4 (and other advanced data communications technologies) should be made permanent in US Amateur Radio regulations.

*Let's just get **on** with it* for US Amateur Radio Operators to be able to use increasingly advanced data communications technologies on HF (and by extension, VHF and UHF). It's just… *inane*… that US Amateur Radio HF data communications are limited to a "300 baud symbol limit" and VHF / UHF data communications are limited to "19.6 kbaud" (50-54 MHz [6 meters] and 144-148 MHz [2 meters]) and "56 kbaud" (222-225 MHz [1.25 meters] and 420-450 MHz [70 centimeters]).

In doing so, the US is increasingly out of step with other countries - one of the reasons cited for these requests by the ARRL is to "… communicate with Caribbean-based stations that are directly involved with hurricane relief efforts." It's humbling that Amateur Radio Operators in Caribbean nations have access to better technology than US Amateur Radio Operators.

This maddening issue has been pending since 2016:

> In 2016, in response to an ARRL petition for rulemaking, the FCC proposed to remove the symbol rate limitations. It tentatively concluded that such limitations had become unnecessary due to advances in modulation techniques and they no longer served a useful purpose. That proceeding, WT Docket 16-239, is still pending.

ARRL kind-of took another run at this in 2019, but filing ex parte comments seems, to me, to be merely tinkering at the margins of the issue.

This issue *isn't only about the use of Pactor 4* on HF; Amateur Radio is constantly developing new

data communications technologies using ever-more-capable digital systems such as the TangerineSDR that uses a very powerful Field Programmable ~~Floating Point~~ *(oops!)* Gate Array (FPGA) to digitize the entire HF band through 54 MHz *simultaneously!* Amateur Radio and allocated portions of spectrum are literally a license to experiment with radio technology! Imagine what *that kind of compute power* in the TangerineSDR dedicated to radio communications can accomplish *if it were possible* to experiment with data communications techniques *that aren't limited to* "300 baud symbol limit".

In my mind, ARRL's legitimacy of their claim to be "The [US] National Association for Amateur Radio" is called into question when it has not been able to work with the FCC to get such commonsense, minor adjustments to Amateur Radio regulations enacted in the era of mobile phones that can also communicate with satellites.

C'mon, ARRL… if you *really* represent US Amateur Radio… *get this DONE!*

de Steve N8GNJ

Comments and Questions Welcome: [44net] Portal Features Requirements Document

This was posted to the 44Net mailing list, but the web archives are only accessible to those who are subscribed to that list. Thus I'm reposting the entire email.

> Hello 44Net!
>
> For quite some time, y'all have heard rumblings of a new portal, which Chris [Smith G1FEF, 44net Administrator] has been working on bit by bit. Realizing that it's likely a larger project than we initially thought, earlier this year the TAC [Technology Advisory Committee] took on the task of writing a feature requirements document. This has been the bulk of their work this year so far, and I'm really proud of the results, which were completed just a couple weeks ago.
>
> I'm writing on behalf of the TAC to share this document with you and to request comments and comments:
>
> https://www.ampr.org/wp-content/uploads/2022-09-Portal-Features-Requirements-Doc.pdf
>
> Ideally, please share your thoughts in this channel rather than emailing directly, though of course we will read any feedback you send. Pierre, the TAC Chair, will be watching the list and answering any questions that may come up.
>
> Note that this document is a feature requirements document - which outlines the features that the portal needs to have before it's considered "done." By definition, it's *not* an engineering document; we've purposefully not specified the exact technology we'll use to build this out. We have, however, specified that it will be released as an open source project as soon as we have a functional version, likely without all features present. Ultimately this will be a project managed by our new Director of Technology (who starts on Monday; will introduce after he starts) and the team he assembles to carry out the build. Thus, information like timelines, project plans, and database specifications, etc., will follow his review of this document and any comments from this group.

And with that, I say - happy reading! And thank you so much for your thoughts and questions.

Looking forward,
Rosy
--
Rosy Schechter - KJ7RYV
Executive Director
Amateur Radio Digital Communications (ARDC)
ampr.org

Connect Systems, Inc. - Consider Yourself Talented at Coding?

This was too interesting not to mention in Zero Retries - I wrote about the CSI CS800D PLUS in Zero Retries 0055. I received this on 2022-09-22 from the Connect Systems Inc. (CSI) mailing list. There is no web version available, so I'm reposting the entire email. I have no involvement with CSI.

CSI is willing to trade a few CS800D PLUS radios for some help with coding. If interested continue reading.

We have three relatively simple firmware routines we want written. For the HAM who writes it we are giving away two CS800D PLUS radios. That is a total of six radios. Each one currently sells for $429.

Two of the routines have already been written for the OPEN GD77 project and what we are asking you do, is make an equivalent. We are not asking you to incorporate the routines in any radio we are only asking you to have it run on a PC. There are some specific requirements.

1. The routine should be written in C, but I will consider C++.

2. The routine should be very well documented so a competent firmware engineer would be able to take your documentation and write a working program.

3. The routines should be in no more than two files. One for the various routines and the other for the variables.

4. Integers should be limited to 32 bits. Floating point acceptable. Shortly after it is written and those functions are implemented in the CS800D PLUS, we will release the source code so the other HAMS could understand exactly how those routines work and maybe even improve and add new features.

The three routines are as follows:

1. Satellite Communication. This routine will determine which satellite to communicate with.

2. Hot Spot. This will allow the radio to effectively act as a hot spot in conjunction with a Raspberry Pi.

3. CTCSS/DCS Decode. Determines the CTCSS/DCS code. If this is not part of the

> OPEN GD77 project. I will give source code written for the MC51 microprocessor as well as give you a source for an alternative way of doing things.
>
> For competitive reasons, we are not going to give all the details now. You will be able to see the details when the routines are released.
>
> If you are interested, please contact me by email at jerry@connectsystems.com or call me at 818 889 0503.

Zero Retries Interesting History - RTTY Journal Archive and the Origins of Packet Radio in Montreal QC

I was doing a web search for a callsign and one of the few mentions I found for that callsign was on this neat website - US Navy Radio Communications - 1950s & 1960s. On that site I found a well-organized archive of the various incarnations of what began as the newsletter RTTY Journal from 1953 - 2017. In the last issue (in this archive) of The New RTTY Journal (Volume 50, Number 4), there's no mention of winding it down, but a quick web search found mention that Editor Bill Henry K9GWT became a Silent Keyboard in 2019.

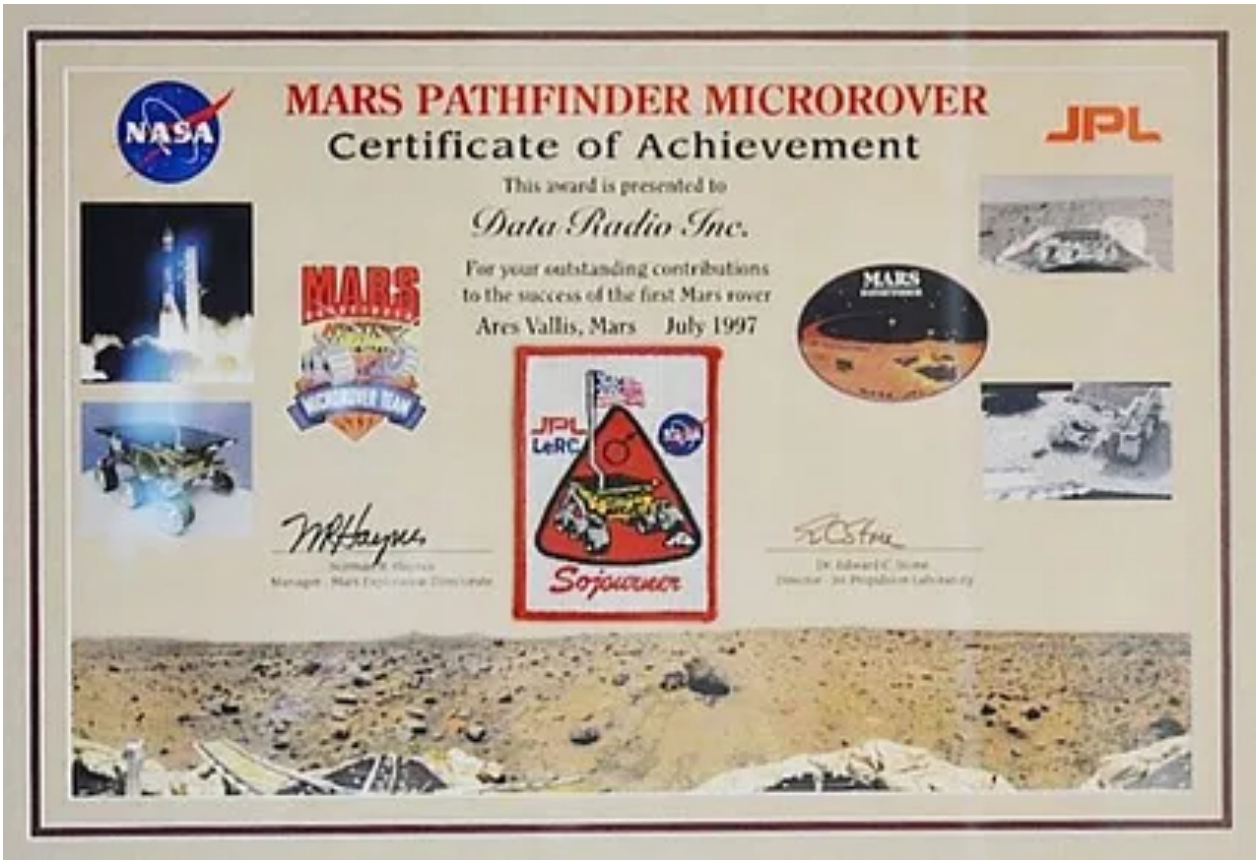
RTTY is Radio TeleTYpe and until microprocessors and microcomputers became available in the 1970s, RTTY was done with mechanical teletype units and modems using discrete analog components. My first interest in Amateur Radio was discovering the RTTY Loop column by Marc Levy WA3AJR in 73 Magazine. By the time I discovered Amateur Radio, microprocessors were becoming widely used, and the first wave of consumer microcomputers had become available and Amateur Radio Operators (and companies) were busy implementing RTTY on them. In comparison to building RTTY modems out of discrete components, microprocessors and microcomputers were "easy". To a young techie with no knowledge of Amateur Radio, I found the idea of communicating digitally via radio to be fascinating. *I still do!*

Another discovery on the web when I was trying to find some surviving copies of Vancouver Amateur Digital Communications Group's newsletter "the packet" was an article by Robert Rouleau VE2PY - It All Began on Ham Radio – My Dataradio Journey. VE2PY recounts the origin of Packet Radio within the Montreal (QC) Amateur Radio Club with the "Montreal Protocol". Excerpt:

> It began in 1978 on ham radio with Norm Pearl VE2BQS, Fred Basserman VE2BQF, Bram Frank VE2BFH and myself, VE2PY. We were pals who chatted on VHF. Fred was a senior programmer and systems guy for a major railroad – a computer guy. Bram was a talented technician, and all of us were fascinated by computers. Fred babysat giant IBM machines, and the rest of us had learned some programming on university mainframes. We could not afford to purchase the kind of machine that we learned on, but a micro-computer was affordable. Like many others, we devoured every issue of computer publications like BYTE as soon as they hit the stands. I think Norm was the one who suggested that we get the Southwest Technology 6800 computer with the FLEX operating system. Sold as a kit, it was more affordable than the Altair and North Star S-100 based machines. We lucked into a source of surplus video terminals, and we were off and running. Amazingly, looking back, we had word processing and fully functional spreadsheets on our primitive systems. Meanwhile, on ham radio, we were alerted of a threat to reallocate the 220 MHz ham band for commercial use. I was then President of the Montreal Amateur Radio Club, and I met Dr. John DeMercado, the Director of Telecom Regulations – the Canadian FCC equivalent.

> While I tried to make a case for preserving this valuable spectrum, Dr. DeMercado spoke passionately about "Packet Radio" and the ALOHA system project (a/k/a ALOHAnet) at the University of Hawaii. He made it clear that wireless data transmission was the future, and that hams should be experimenting with it. Radio and computers - what could be bad? He gave me copies of the technical papers about the 1975 ALOHA project. I shared the documents and the math surrounding the protocols for transmitting small envelopes of data that they called packets. Hours were spent on VHF digesting what we had learned. Gradually, the idea formed: that hams could pioneer and demonstrate this new technique, and perhaps hams could convince the regulatory authorities to permit experimentation with packet radio and also save the 220 MHz band. Using surplus 1200 baud Bell 202 modems and a very primitive transmission protocol toggled into a ROM by Jacques Orsali VE2EHP, we demonstrated the first amateur packet transmission for Dr. DeMercado at a special meeting of the Montreal Amateur Radio Club on May 31, 1978. He was pleased, and he sent the first official amateur packet: "Well done, Bravo!" Dr. DeMercado subsequently set aside a portion of the 220 MHz band for amateur packet. Furthermore, he created a code free amateur license – a first in Canada called The Digital. In place of Morse code, the applicant had to demonstrate knowledge and understanding of packet transmission, queuing theory, information theory, the Shannon and Nyquist theorems - in other words, not the stuff of regular ham radio tickets. Along with Dr. DeMercado, we were the first recipients of the new license. We had the computer hardware and radios, but we needed a modem. Commercial units were far too expensive for hobbyists like us. Bear in mind we were using 300 baud acoustic coupled telephone modems to talk to sites like The Source. Commercial 2400 baud modems cost thousands of dollars! I stumbled on an Application note from Exar for a simple modem and built the first one. Jack Orsali, a senior technician for Bell Canada Data, used off hours to test and tweak the design in Bell's superbly equipped lab. It worked remarkably well. Soon all of us had them up and running.

VE2PY went on to cofound Dataradio with VE2BQS to build commercial packet radio systems that became widely used in public safety vehicles… *and Mars Pathfinder!*



Certificate of Achievement for participation in the Mars rover program.

> A version of [the R-Net 9600] modem ended up on the successful Mars Mission in 1995. The rover, called Sojourner, used our 9600 bps radio modems to communicate with the lander for back haul via the deep space network to NASA. It showed up in the movie The Martian as the salvation of a stranded astronaut. The story of Sojourner is documented on the NASA website – search Dataradio and Sojourner for more of the story. There is an amusing anecdote to this story, NASA asked if our modem chip was hardened against cosmic radiation. Needless to say, we had never considered that aspect. Fortunately, tests showed that it was capable.

VE2PY concludes:

> ***Looking back, it is hard to imagine that it all began as a basement experiment on ham radio.***

The creation of Dataradio was yet another example of technological innovation in Amateur Radio.

Silent Keyboard - Gary Ross Hoffman KB0H

I knew KB0H only through his writing of his blog The *Amateur* Amateur where he told of his foibles in Amateur Radio, usually learning the practical aspects of Amateur Radio the hard way. The Zero Retries Interesting tie-in is that all of us Amateur Radio Operators start out knowing next to nothing about the *practical* aspects of Amateur Radio, such as how to safely (or unsafely…) put up an antenna, and KB0H reminded me of that. KB0H had an engaging writing style, and he was an

“everyman” Amateur Radio Operator that we could all identify with. I exchanged a few emails with KB0H about a subject he wrote about that perplexed him. I found out KB0H had transitioned to Silent Keyboard when his website went offline, but fortunately the Internet Archive’s Wayback Machine has preserved at least some of his writing.

ZR > BEACON

Conventional vs Inverter Generators

Good article on generators from an Amateur Radio Operator perspective, and why more expensive generators using inverters are better (and gentler on your precious electronics and other electrical devices).

‘You never know who’s on the other side’: Amateur radio enthusiasts use old-school tech to connect

This is notable not because it talks about technologicial innovation in Amateur Radio (Zero Retries Interesting), it’s notable because it appeared in a tech news site for the Seattle area. My thanks to Peter Dahl WA7FUS for spotting this.

Motorola 16 Pin Mini Din Packet Adapter

I mentioned another RPC Electronics, LLC 6-pin MiniDIN adapter in the previous issue. This one is also a well-conceived adapter for Motorola radios that have a (unique to Motorola) 16 Pin interface connector. I think that *someone* could make at least a microbusiness out of purchasing these types of Motorola radios inexpensively as surplus, testing them, and converting them to Amateur Radio frequencies for data communications. I would certainly buy them for various projects.

New Version of the Raspberry Pi Operating System

Version number unstated. No big changes (from my perspective) other than network management on the RPi has been simplified a bit.

How to Make Meteor Scatter QSOs

Good video presentation by Jim Wilson K5ND. Thanks to Amateur Radio Weekly for spotting this.

Zero Retries Sponsorships

The Zero Retries sponsorship model is *evolving*, but it’s initially inspired by the Daring Fireball blog’s sponsorship model (other than this sponsorship cost). Some initial points:

Sponsorship of Zero Retries is only available to “Zero Retries Interesting” companies, organizations, individuals, and projects. Ideally, a Zero Retries sponsor is involved in Amateur Radio, but that’s not an absolute requirement. If an individual or company would like to sponsor Zero Retries, but prefer to remain anonymous, that’s acceptable, but the “Zero Retries Interesting” criteria still apply.

- Sponsorships are limited to a *brief* mention in Zero Retries - a few sentences at most (but prominently displayed). Example - "WhizzyPacket is proud to sponsor this week's Zero Retries". More targeted sponsorship messages are acceptable, such as "WhizzyPacket is looking for a few good engineers - click here".

- A sponsorship is for *one* weekly issue of Zero Retries and is exclusive - one sponsor per week. Sequential sponsorships are available - as much as three months of sponsorship is acceptable. Longer than three months, let's discuss it.

- Lastly, although it kind of defeats the overt purpose of sponsorship, if a *Zero Retries Interesting company, organization, individual, or project cannot afford to pay for a sponsorship*, but wants / needs to "get the word out", Zero Retries can probably work something out. In fact, if there are gaps in sponsorships, I'll probably create some gratis sponsorship messages.

If you are interested in sponsoring Zero Retries, please reach out - it's early days. More importantly, if you know of a company, organization, project, or individual that you think could / would / should sponsor Zero Retries, *please point out Zero Retries to that entity*.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*

- Pseudostaffer Dan Romanchik KB6NU for continuing to spot, and write about "Zero Retries Interesting" items on his blog that I don't spot on my own.

- Amateur Radio Weekly and Southgate Amateur Radio News consistently surface "Zero Retries Interesting" stories.

- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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Leave a comment

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More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted in beautiful Bellingham, Washington, USA
2022-09-30

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